Amendments to the Claims:

The following listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (currently amended) ~~A system~~ An apparatus for processing ~~magnetically stored data~~ a magnetic medium having digital data residing thereon, wherein the data on the magnetic medium is formed using a number of data blocks and wherein each data block includes a tone field, comprising:

~~a magnetic medium having digital data residing thereon;~~

a tone detector operative to detect a frequency in at least one tone field and provide framing information to a partial response signaling device; and

means for performing a low-density parity check operation on the digital data residing on the magnetic medium.

2. (currently amended) The ~~system~~ apparatus of claim 1, wherein the means for performing a low-density parity check operation uses a low-density parity check code and a respective low-density parity check matrix having n-rows and m-columns where m and n are positive integer numbers, and wherein any two columns of the low-density parity check matrix have a maximum of one common location containing a non-zero entry.

3. (currently amended) The ~~system~~ apparatus of claim 2, wherein the low-density parity check code has a rate of 16/17, and the low-density parity check matrix has a constant column weight of three and a constant row weight of fifty-one.

4. (currently amended) The ~~system~~ apparatus of claim 1, wherein the means for performing a low-density parity check operation processes data using a low-density parity check matrix, wherein the low-density parity check matrix has a size of 272 rows by 4624 columns.

5. (currently amended) The ~~system~~ apparatus of claim 4, wherein the low-density parity check matrix is formed using 17 sub-matrices, each sub-matrix having 272 rows and 272 columns, and each one can be computed from one another. Each row in a sub-matrix can also be computed by ~~cylic-shifting~~ cyclic-shifting the previous row.

6. (currently amended) The ~~system~~ apparatus of claim 4, wherein each sub-matrix of the low-density parity check matrix is divided into 17 sub-portions, each sub-portion having 16 consecutive columns, and wherein each sub-portion is constructed such that any 2 columns within the sub-portion have no common location containing a non-zero entry.

7. (currently amended) ~~The system of claim 4,~~ An apparatus for processing magnetically stored data, comprising:

a magnetic medium having digital data residing thereon; and

means for performing a low-density parity check operation on the digital data residing on the magnetic medium, wherein the means for performing a low-density parity check operation processes data using a low-density parity check matrix, wherein the low-density parity check matrix has a size of 272 rows by 4624 columns, and wherein the means for performing a low-density parity check operation includes a checks-to-bits device that determines the minimum-entry for a particular row of the low-density parity check matrix, and further determines the second-minimum-entry in the same particular row.

8. (currently amended) The ~~system~~ apparatus of claim 7, wherein the checks-to-bits device further determines a sign value.

9. (currently amended) The ~~system~~ apparatus of claim 8, wherein the checks-to-bits device assigns one of a .+-.min1 or a .+-.min2 value to a row of the low-density parity check matrix.

10. (currently amended) The ~~system~~ apparatus of claim 1, wherein the data on the magnetic medium is formed using a number of data blocks, each data block including a data field, a sync field and a tone field.

11. (currently amended) The ~~system~~ apparatus of claim 1, wherein the data on the magnetic medium is formed using a number of data blocks, each data block including a tone field; and wherein the ~~system~~ apparatus further includes a tone detector that detects a frequency in at least one tone field, then provides framing information for a partial response signaling device.

12. (currently amended) The ~~system~~ apparatus of claim 1, wherein the data on the magnetic medium is formed using a number of data blocks, each data block including a sync field; and wherein the ~~system~~ apparatus further includes a sync detector that detects a sequence in at least one sync field, then provides alignment information for aligning data to the low-density parity check means.

13. (currently amended) An apparatus for performing a low-density parity check operation on a block of received data, comprising:

means for performing a bits-to-checks computation, wherein the means further comprise a bits-to-check device; and

means for performing a check-to-bits computation, wherein the means further comprises a checks-to-bits device that determines the minimum-entry for a particular row of a low-density parity check matrix, and further determines the second-minimum-entry in the same particular row, and wherein the low-density parity check matrix has a size of 272 rows by 4624 columns.

14. (original) The apparatus of claim 13, wherein the checks-to-bits device further determines a

sign value.

15. (original) The apparatus of claim 13, wherein the low-density parity check matrix is cyclic.

16. (original) The apparatus of claim 13, wherein the apparatus uses a low-density parity check matrix having a size of two-hundred seventy-two rows by four-thousand six-hundred and twenty-four columns, and wherein the low-density parity check matrix is divided into seventeen sub-matrices of two-hundred seventy-two rows by two-hundred seventy-two columns.

17. (original) The apparatus of claim 16, wherein each sub-matrix of the low-density parity check matrix is divided into seventeen sub-portions, each sub-portion having sixteen consecutive columns, and wherein each sub-portion is constructed such that any two columns within the sub-portion have no common location containing a non-zero entry.

18. (original) The apparatus of claim 13, wherein the apparatus uses a low-density parity check code having a rate of 16/17, and the low-density parity check matrix has a constant column weight of three and a constant row weight of fifty-one.

19. (original) A system for processing magnetically stored data, comprising:

a magnetic medium having digital data residing thereon, the digital data being formed using a number of data blocks, each data block including at least a data field and a tone field; and

a decoder that includes a tone detector that detects a frequency in at least one tone field, then provides framing information to a partial response signaling device.

20. (original) The system of claim 19, wherein each data block further includes a sync field; and wherein the decoder further includes a sync detector that detects a sequence in at least one sync field, then provides alignment information for aligning data to a low-density parity check device.

21. (new) An apparatus for decoding encoded digital data formed into a number of data blocks, each data block including at least a field of original data, a tone field, and a sync field, comprising:

a read/write head that is configured to read the encoded digital data and output its data blocks as a digitized signal to a pre-processor;

a pre-processor that is configured to correct the digitized signal for any asymmetry and output the corrected signal to a tone detector and a finite impulse response filter;

a tone detector that is configured to detect a frequency in at least one tone field in the corrected signal and output framing information to a partial response signaling device and the corrected signal to the sync detector;

a finite impulse response filter that is configured to perform an equalization process on the corrected signal and output the equalized signal to an interpolate timing recovery device;

an interpolate timing recovery device that is configured to recover timing and frequency information from the equalized signal and output a gain-compensated, equalized signal to the partial response signaling device, wherein the interpolate timing recovery device further comprises an automatic gain control device that is configured to compensate for any gain change to the equalized signal;

a partial response signaling device that is configured to perform a partial response decoding operation on the gain-compensated, equalized signal, using the framing information from the tone detector, and output PR4 decoded data to an un-shuffler and a sync detector;

a sync detector that is configured to detect at least one sync field in the PR4 decoded data, using the corrected signal from the tone detector, and output an alignment signal to the un-shuffler and the low parity density decoder;

an un-shuffler that is configured to extract and order parity bits in the PR4 decoded data, using the alignment signal from the sync detector, and output un-shuffled data to the low parity density decoder;

a low parity density decoder that is configured to perform a low parity density

decoding operation on the un-shuffled data, using the alignment signal from the sync detector, and output LDPC decoded data to the run-length limiting decoder; and

a run-length limiting decoder that is configured to perform a run-length limiting decoding operation on the LDPC decoded data to extract the original data.